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If even the least significant of all of the facts reported from England be accepted, we are left to deal with an unknown something quite apart from instinct, — something, for so it seems to me, which cannot be compared with it in any way, but which is the evidence of a higher order of brain-manifestation than we have yet met with.

HORATIO R. BIGELOW, M.D.

Leipzig, Feb. 28.

The tail of *Chlamydoselachus*.

A recent opportunity of examining a second specimen of *Chlamydoselachus* furnished the means of adding an item or two to our knowledge of that peculiar genus. In several points the example differed from that originally described. This was notably the case with the tail. On the later capture, this organ was a little more than one-fourth of the total length, and, with the vertebral column, tapered to a sharp extremity; whereas in the first one it stopped abruptly, with vertebrae of considerable size, as if truncate. On the new one, the lateral line, with a few short breaks posteriorly, continued to within an inch of the end of the tail. All this indicates that the tail of that which served as the type was deformed and incomplete: the deformity, in all likelihood, being of embryonic origin. Proportioned as the new one, the tail of the type would have been seventeen inches long, instead of which it was but little more than ten. Completed, the type would have had a total length of sixty-six inches, to a circumference of eleven and a half. The more recent specimen had a length of forty-eight, to a circumference of ten and a half inches, which made it rather less slender and snake-like than its predecessor.

Another difference occurred in the dentition, which, in the last examined, showed variations in the number of denticles between each lateral cusp and the median: sometimes there were two, sometimes but one.

The tropic folds, abdominal keel, were present, as on the specimen from which the original description was taken.

S. GARMAN.

Cambridge, Mass., March 11.

The Quebec group.

Thinking it may be interesting to geologists to learn the latest conclusions in reference to the stratigraphical succession and distribution of the rocks in the province of Quebec, hitherto known as the 'Quebec group,' I send you the following brief observations on this subject: —

As is well known, the divisions made by my predecessor, the late Sir W. E. Logan, of this interesting and exceedingly complicated group of formations, were in ascending order, — Levis, Lauzon, and Sillery, — and these together were supposed to represent a peculiar phase of the calciferous and chazy formations of the New York lower paleozoic series. I have elsewhere made known as the result of personal investigation that portions of several systems and formations had evidently been included in the Quebec group as described in the 'Geology of Canada, 1863,' and depicted on the geological map of Canada, published in 1866. During a personal examination of a large portion of the area during the seasons of 1876, 1877, and 1878, I recognized strata which I

considered clearly belonged to systems and formations ranging from pre-Cambrian to Silurian; and also that much of the so-called 'Sillery' was in reality not the youngest, but the oldest member of the group, and of pre-Cambrian age.

All subsequent investigation has confirmed the correctness of these conclusions, first advanced in a paper read before the Natural history society of Montreal in February, 1879, and more fully treated in reports and papers since published in 1880, 1883, and 1884. Since the date of the last of these publications, considerable additional information relating to the distribution of the several formations has been acquired; and I now find that no less than four distinct horizons can be recognized, each of which is marked by important bands of conglomerate. Three of these (Nos. 2, 3, and 4) are fossiliferous limestone conglomerates, while one (No. 1) is chiefly felspathic and dioritic, is non-fossiliferous, and generally presents the appearance of a volcanic agglomerate or breccia, which in places becomes a brecciated serpentine, or is otherwise variously altered, and is often schistose and micaceous, — pre-Cambrian.

No. 2 is of Cambrian age, and is best seen along the south shore and at the north end of the Island of Orleans, at Bic, at Metis, and at several points lower down, on the south side of the St. Lawrence Gulf.

No. 3 is the celebrated Levis conglomerate, well exposed at Point Levis and at the south-west end of the Island of Orleans. It is interbedded with gray and dark blue highly graptolitic slates, recognized by Professor Lapworth as marking the phyllograptus zone of Europe. It also recurs with its associated phyllograptus slates at several points between Metis and the Marsouin River on the south shore of the St. Lawrence, always in discordant contact with the strata of the preceding group.

No. 4 is the limestone conglomerate of the Quebec Citadel Hill. It occurs there in three or four more or less lenticular beds, none of which exceed six feet in thickness: they are associated and interbedded with black highly carbonaceous and graptolitic strata, yielding a valuable cement-stone. Both to the northeast, before reaching the Island of Orleans, and to the south-west, these beds are cut off by the curving line of the great St. Lawrence and Champlain or Appalachian fault, and are brought into abrupt contact with the red and greenish gray slates of No. 2. They appear again, however, on the south side of the St. Lawrence near St. Antoine, and thence pass beneath the drift-covered level country to the south-west. I believe these beds to be a part of the Utica, Hudson River, or Lorraine group. Professor Lapworth, who has recently examined the graptolitic fauna from these rocks, considers it to denote a stage older than Trenton limestone, but decidedly newer than the Levis phyllograptus zone. The latter view is entirely in accord with the stratigraphical evidence as first published by me in 1879; but, so far as the stratigraphy is at present known, it is as decidedly opposed to the former conclusion. Lists by Professor Lapworth, of the graptolites from the different horizons above named, will appear in the volume of the Transactions of the Royal society of Canada, shortly to be published.

The fauna of No. 2 conglomerate, as well as that of the associated slaty and shaly beds, is exclusively of Cambrian type, — *Dictyonema sociale*, *Eophyton Linneanum*, *Cruziana* (?) *Paradoxides-Archaeocyathus*, etc.